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MIGRATION OF FLOCKS OF HONEY BUZZARDS IN SOUTHERN ITALY AND MALTA

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KEY WORDS: *Honey Buzzards*; *Pernis apivorus*; *migration*; *flocking behavior*; *orientation*; *navigation*.

Honey Buzzards (*Pernis apivorus*) frequently migrate in flocks that become concentrated in narrow coastal areas (Cramp and Simmons 1980, Kerlinger 1989). During migration over the central Mediterranean, they use mainly two routes. One route is from Sicily to Tunisia and the second route goes across a larger stretch of sea via the islands of Malta (Moreau 1953, Beaman and Galea 1974, Brown et al. 1982, Agostini et al. 1994b). In autumn, a major concentration of buzzards occurs in the Calabrian Apennines (southern Italy), where the distance between the Tyrrhenian and Jonian coasts is narrowest (Agostini and Logozzo 1995a, 1995b). As at the Strait of Gibraltar and the Bosphorus (Porter and Willis 1968, Bernis 1973),

peak numbers of buzzards are observed between the end of August and the beginning of September.

Adult Honey Buzzards migrate using this route and probably use the same route in spring, crossing the central Mediterranean between Sicily and Tunisia (Agostini et al. 1994a, Agostini and Logozzo 1995b). This assumption is supported by observations on the island of Marethimo (western Sicily), where large flocks of buzzards are seen between the end of August and the beginning of September (Zangirolami pers. comm.). Unlike adults, young buzzards appear to concentrate on the island of Malta (Agostini and Logozzo 1995b) after the second week of September (Beaman and Galea 1974). This study was undertaken to determine if flocks of immature buzzards on Malta result because young birds stopover on the island during periods of bad weather or if they con-

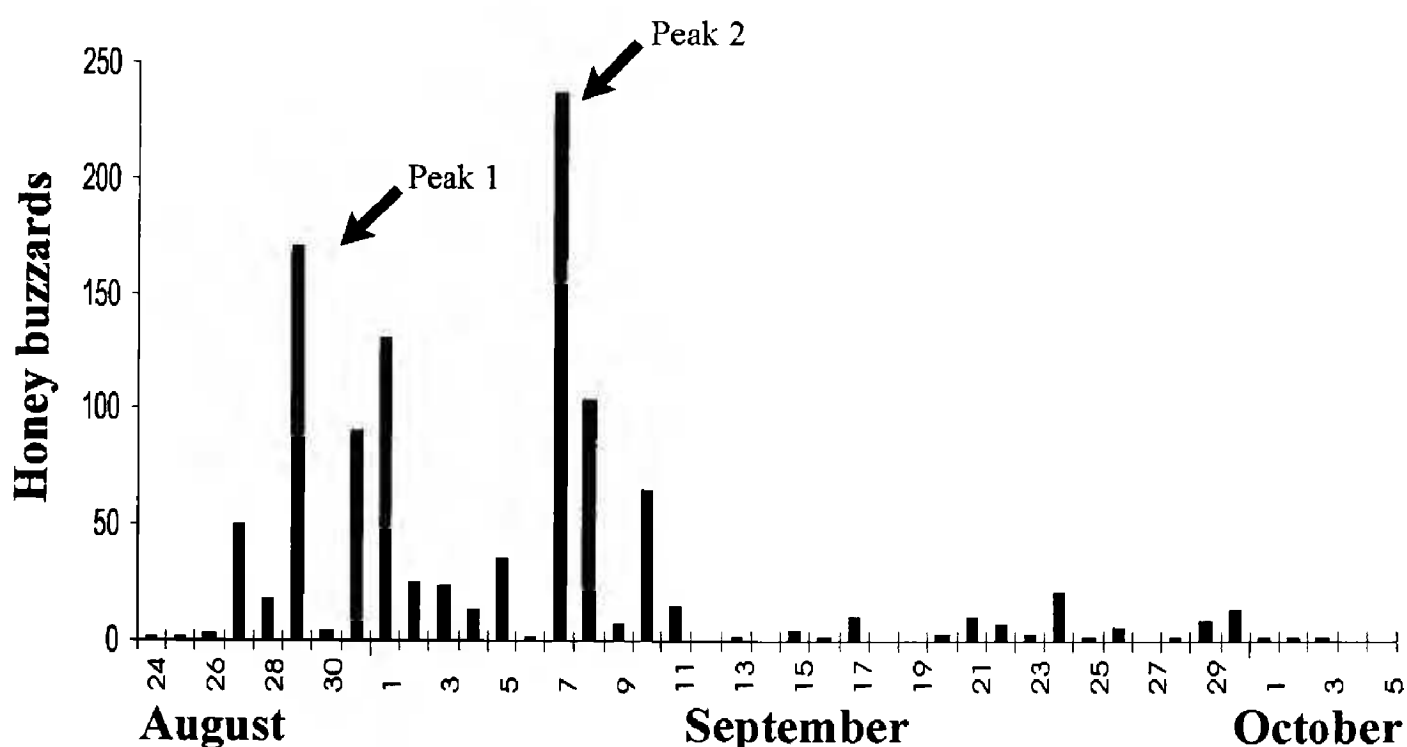


Figure 1. Seasonal occurrence of migrating Honey Buzzards in the Calabrian Apennines in summer and autumn of 1995.

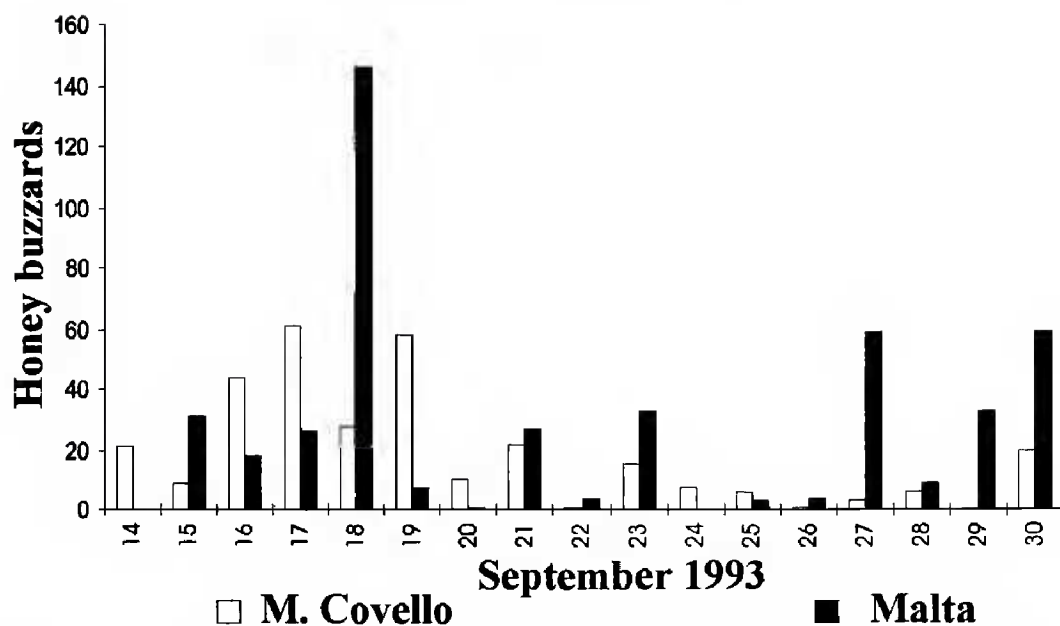


Figure 2. Variations in migration of Honey Buzzards from 14–30 September 1993 on Mount Covello and Malta.

gregate until adult buzzards can show them the shortest route across the Mediterranean.

STUDY AREA AND METHODS

Migrating Honey Buzzards were counted in the Calabrian Apennines and from a post on the slopes of Mount Covello (elevation 700 m) from 24 August–5 October 1993 and 1995. Buzzards were also counted on the Island of Malta. There, the observation post was situated on the highest point on the island (approximately 250 m elevation) from 6 September–5 October 1993 and 1995. A total of 334 hr of observations were tallied at Mount Covello using 10 × 50 binoculars and a total of 188 and 177 hr of observation were tallied using 10 × 40 binoculars on the Island of Malta in 1993 and 1995, respectively.

RESULTS

A total of 1095 Honey Buzzards were counted in the Calabrian Apennines and more than 90% were observed between 24 August–12 September. The number of migrating buzzards showed a bimodal distribution with peaks occurring in late August and after the first week of September (Fig. 1). In both years, there was overlap in the migration periods of adult and juvenile buzzards but over twice as many adults were observed in both years (adults = 346, juveniles = 136). In 1995, the number of adults observed was also significantly greater than in 1993 ($\chi^2 = 6.38$, $P < 0.05$).

A total of 483 Honey Buzzards were counted on the Island of Malta in 1993 but only 88 were counted in 1995. More than 97% of them were observed in September and this corresponded with counts in the Calabrian Apennines (Fig. 2).

DISCUSSION

Some authors have shown that migrating birds orient better when they fly in groups (Keeton 1970, Rabol and Noer 1973, Wallraff 1978, Von Helbig and Laske 1986), especially when groups contain adults that can show to correct migration route (Kerlinger 1989). Our observations suggest that juvenile Honey Buzzards learn the shortest route to cross the central Mediterranean by mi-

grating in flocks of adults. This would explain why the Honey Buzzard is commonly seen in Malta, where the African coasts are more than 400 km away.

Flocking behavior might have another function. Studies carried out on the Cap Bon promontory (Tunisia) during the spring migration of Honey Buzzards and Black Kites (*Milvus migrans*) have shown that these raptors cross the Channel of Sicily more frequently when migrating in large flocks (Agostini and Duchi 1994, Agostini et al. 1994a). This behavior suggests that flocking is important for water crossing because an increase in flock size increases the probability the journey over water will be successfully completed (Agostini and Duchi 1994, Agostini et al. 1994b).

RESUMEN.—Observaciones de *Pernis apivorus* emigrando a través de el centro Mediterranean fueron hechos en los Calabrian Apennines (el sur de Italy) del 24 de agosto–5 de octubre 1995, y en Malta del 6 de septiembre–5 de octubre 1993 y 1995. En los Calabrian Apennines, 1095 *P. apivorus* fueron observados, con un máximo de 237 pájaros emigrando e el 7 de septiembre. Casi todos los *P. apivorus* fueron observados entre el 24 de agosto–12 de septiembre. En Malta, 483 y 83 *P. apivorus* fueron contados en 1993 y 1995, respectivamente, con casi todos contados después del 15 de septiembre. Estos resultados proponen que *P. apivorus* jóvenes aprenden la ruta mas corta para cruzar el centro Mediterranean durante el primer año de migración cuando van en bandadas con adultos que han hecho la migración antes.

[Traducción de Raúl De La Garza, Jr.]

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NESTING-TREE PREFERENCE AND NESTING SUCCESS OF JAPANESE LESSER SPARROWHAWKS IN JAPAN

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KEY WORDS: *Accipiter gularis*; *Pinus densiflora*; *Japanese Lesser Sparrowhawk*; *Japanese red pine*; *nesting success*; *nest tree preference*.

Japanese Lesser Sparrowhawks (*Accipiter gularis*) breed throughout northeastern Asia (Brown and Amadon 1968). It has been shown that tree plantings in lowland areas are important breeding sites for this hawk in Japan (Endo et al. 1991) and these hawks mainly nest in Japanese red pines (*Pinus densiflora*) (Endo and Hirano 1990, Hirano and Kimizima 1992). Because prey abundance does not seem to be limiting (Hirano and Kimizima 1992, Ueta 1992), the availability of nest sites may be an important factor limiting the population of Japanese Lesser Sparrowhawks (Ueta 1996). Because nest sites of Japa-

nese Lesser Sparrowhawks are important in predicting future populations of this hawk in Japan, I examined the nest-tree preferences of Japanese Lesser Sparrowhawks and determined whether such preferences influence nesting success.

METHODS

The study was conducted from 1987–94 at 16 groves of trees in suburban areas of Tokyo. The groves were isolated and ranged from 1–4 ha in area. They were mainly coppices composed primarily of Japanese chestnut oak (*Quercus acutissima*), Storax (*Styrax japonica*) and Sawara cypress (*Chamaecyparis pisifera*).

To determine nest-site preference, use by sparrowhawks and the availability of different tree species were compared. I excluded nests in which the hawks did not